

## Trend of Demand of Energy Sector in India

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**Abstract:**

India is emerging as the next energy hub of the world. The country has emerged as a repository of wealth, of crude oil, natural gas and lignite. The extensive occurrences of petroliferous basins in India have made it a large potential region for hydrocarbons.

The purpose of this study is to understand the structure of energy sources in India. It is tried to find out demand and supply of energy sources i.e. petroleum products and natural gas in India. It is tried to find out trend of demand and production energy sector in India. It is help to provide a significant business opportunity and to find out comparison among energy resource in India.

**Keywords:** Energy Resource, Potential, Petroleum product, natural gas, demand and supply

### I. INTRODUCTION

Natural gas and oil is one of the energy resources and past experience suggests that oil exploration and related ventures lead to a multidimensional growth and development of the region and nation as a whole. The natural resources are considered more efficient and appropriate for necessary survey and investigation for the assessment, subsequent planning and implementation of various developmental programmes

### II. LITRATURE REVIEW

Previous studies in the literature show that the main influencing factors include supply and demand imbalance, speculation and hedging activities, geopolitics and the value fluctuation of the US dollar, etc. Owing to the possibilities of variable quantification and data availability, the relevant studies of economics are mainly carried out from the perspective of generalized supply and demand analysis (John, 2003, 66).

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### III. RESEARCH OBJECTIVES

The purpose of this study is to understand the structure of energy sources in India. To find out trend of production and demand of energy sources i.e. petroleum products, Natural Gas and Oil in India from 2004-5 to 2011-12 and forecasted up to 2016-17.

- To study the current status of oil and gas Industry in India
- To analyze demand and production of energy sector in India
- To forecast demand and supply up to 2016-17

### IV. HYPOTHESIS

In order to realize the above objectives, the following hypothesis has been formulated.

*Hypothesis 1* there is sufficient availability of production of energy sources in India

*Hypothesis 2* there is sufficient availability of demand of energy sources in India

*Hypothesis 3* There is increasing trend in production of energy sources in India

### V. RESEARCH DESIGN & METHODOLOGY

The researcher, being an external analyst, is depend mainly upon secondary data for the purpose of studying the potential of natural resources and energy resources and evaluating trend of Natural Gas and oil and energy sector in India. The exploratory research techniques will have been used for this study and also the study is restricted only gas, oil and petroleum in India.

#### *Primary Research*

A number of methods will be utilized in collecting data from the ground sources, these are:

- a) Personal Interviews with the authority persons
- b) A Telephone Interview with some influential capital market personals

One of major limiting factor in the above is that of time, as it will be difficult to get time from these personals. Moreover designing a questionnaire will also be a complex task as it will be required to cover the relevant points presented in the best way possible. Finally analysis of the qualitative data would again be a difficult task for which published help will be taken and a conclusion would be based on the results of the primary and library research.

#### *Secondary Research*

This research would more be based on qualitative factors and procedures for data gathering rather than numbers and quantifiable values. There are loopholes of this procedure such as:

- a) Extensive complexity associated to analyzing the qualitative data, because comprehension of qualitative data and its judgment depends on the nature and knowledge of the individual analyzing it.
- b) There are no standardized data categories or collection mechanisms within the predefined methods and techniques of data collection.

## VI. METHODS OF DATA COLLECTION

For the study in hand, both the primary and secondary data was collected. The sources of collecting both the data is as follows:

**Sources of Primary Data:** The primary data for the study was collected directly from target respondents through structured questionnaire. The questions asked to respondents were about production of various energy sources.

**Sources of Secondary Data:** present study is mainly based on secondary data which were collected from the corporate annual audited reports, company database, published research reports by various industries, related websites, and annual report of different companies of different industry and research organizations.

## VII. TOOLS FOR ANALYSIS OF DATA

Along with the usual statistical tools such as tables, percentages, mean, standard deviation, rank method for mean, standard deviation and coefficient of variance was used for analyzing the data which helps in arriving at sound conclusions.

## VIII. SELECTION OF PERIOD

The present study is mainly intended to find the trend of oil and gas. The demand and production of petroleum products energy sector is examined in the period from 2004-5 to 2011-12 and forecasted up to 2016-17.

## IX. RESULT & DISCUSSION

### *Research Technique Applied*

**Table I:** Production of Petroleum Products

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PRODUCTS	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12*
1	2	3	4	5	6	7	8	9
			(a) From Crude Oil					
1. Light Distillates	32865	32427	38104	40111	40222	51197	55249	58004
of which								
LPG	5570	5525	6315	6732	6996	8091	7541	7335

Mogas	11057	10502	12539	14167	16020	22537	26138	26890
Naphtha	14100	14509	16660	16440	14826	17105	17535	17176
OthersLD	2138	1891	2590	2772	2380	3464	4035	6603
2. Middle Distillates	62509	64432	71225	76649	80309	93790	99771	103493
of which								
Kerosene	9298	9078	8491	7794	8223	8545	7702	7475
ATF/RTF/Jet A-1	5201	6196	7805	9107	8071	9296	9570	10057
HSD	45903	47572	53465	58361	62889	73281	78040	81901
LDO	1546	923	803	671	606	472	590	502
OthersMD	561	663	661	716	520	2196	3870	3558
3. Heavy Ends	23205	22891	25931	28170	29985	34782	35296	35210
of which								
Furnace Oil	10560	10320	12325	12638	14749	15828	18659	17755
LSHS/HHS/RFO	4410	3985	3372	3166	2935	2518	1860	1701
Lube Oils	646	677	825	881	874	950	884	994
Bitumen	3349	3576	3891	4507	4713	4889	4478	4610
Petroleum Coke	3162	3182	3779	4129	4241	3709	2711	4480
Paraffin Wax	64	63	63	64	69	64	61	81
Others Waxes	4	3	5	7	5	3	6	7
OthersHE	1010	1085	1671	2778	2399	6821	6637	5582
<b>Total (1+2+3)</b>	118579	119750	135260	144930	150516	179769	190316	196707
		(b) From Natural Gas						
LPG	2240	2185	2093	2060	2162	2243	2168	2213

Source: Ministry of Petroleum & Natural Gas, Govt. of India, New Delhi

**Note:**

*Light Distillate:* Includes Propylene, C-3, Propane, Hexane, Special Boiling Point Spirit, Benzene, Toluene, Petroleum Hydro Carbon Solvent, Natural Heptane, Methyl Tertiary Butyl Ether, Poly Isobutene, Poly Butadiene Feed Stock and Methyl Ethyl Ketone Feed Stock.

*Middle Distillate:* Includes Mineral Turpentine Oil, JP-5, Linear Alkyl Benzene Feed Stock, Aromex, Jute Batching Oil, Solvent 1425, Low Sulphur, Heavy Fuel HSD, Desulphurisation Hydrocracker Bottom and Special Kerosene.

*Heavy Ends:* Includes Carbon Black Feed Stock, Sulphur, Solar Oil, Light Aluminium Rolling Oil and Extracts

**Table II:** Estimated Demand for Petroleum Products in 12th Plan (2012-17)

(MMT)

Products	Demand of Petroleum Products					
	2012-13	2013-14	2014-15	2015-16	2016-17	Total
<i>1. Petroleum Products ('000MT)</i>						
LPG	169.86	18.363	19.675	20.857	21.831	250.586
MS	160.91	17.527	19.083	20.766	22.588	240.874
NAPHTHA/NGL	12.353	11.417	11.417	11.022	11.022	57.231
ATF	6.009	6.587	7.202	7.849	8.54	36.187
SKO	7.949	7.631	7.326	7.033	6.751	36.69
HSDO	65.04	68.654	72.589	76.904	81.599	364.786
LDO	0.4	0.4	0.4	0.4	0.4	2
LUBES	2.691	2.772	2.857	2.945	3.036	14.301
FO/LSHS	7.954	7.902	7.899	7.872	7.872	39.499
BITUMEN	5.254	5.541	5.732	5.971	6.114	28.612
PET COKE	6.765	7.514	8.345	9.268	10.294	42.186
OTHERS	5.445	6.127	6.109	6.085	6.162	29.928
Total (Petroleum Products)	152.937	160.436	168.635	176.972	186.209	845.189
<i>2. Natural Gas (MMSCMD)</i>	293	371	405	446	473	1988

Source: Ministry Of Petroleum &amp; Natural Gas, Govt. Of India, New Delhi

**Table III:** Estimated Production of Petroleum Products in 12th Plan

						(M MT)
Products	2012-13	2013-14	2014-15	2015-16	2016-17	Total
<b>1. Crude Processing</b>	236.478	245.308	247.008	261.828	286.618	1277.24
<i>2. Petroleum Products</i>						
LPG	9.255	10.345	10.659	11.358	13.087	54.704

Naphtha	18.1 47	18.7 72	18.6 95	20.0 88	22.7 13	98.4 15
MS	30.0 71	31.6 2	32.6 79	36.0 03	38.7 63	169. 136
HSD	95.63 8	97.57	100.178	106.222	116.52	516.128
ATF	11.98 4	12.643	12.843	14.316	16.037	67.823
SKO	8.376	8.697	8.98	9.4	9.743	45.196
LDO	0.48	0.338	0.338	0.163	0.218	1.537
FO/LSHS	16.14 7	15.557	11.408	11.186	10.084	64.382
BITUMEN	5.209	5.482	5.595	5.446	5.62	27.352
LUBES & GREASES	0.792	0.871	0.883	0.895	1.302	4.743
OTHERS	25.48 9	28.028	29.538	31.699	35.525	150.279
<b>Total (Petroleum Products)</b>	<b>221.5 88</b>	<b>229.923</b>	<b>231.797</b>	<b>246.776</b>	<b>269.611</b>	<b>1199.695</b>

Source: Ministry Of Petroleum & Natural Gas, Govt. Of India, New Delhi

## ANALYSIS

**Table IV:** Demand and supply of various product

<b>Total (Petroleum Products)</b>						
<b>Year</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>	<b>Total</b>
Demand	152.937	160.436	168.635	176.972	186.209	845.189
Supply	221.588	229.923	231.797	246.776	269.611	1199.7

**Table V:** Correlation between demand and supply of various product

LPG	-0.650621407
Naphtha	-0.698748278
MS	-0.573584284
HSD	0.960501733
ATF	0.961302362
SKO	-0.996694751
LSHS/FO	0.832365081
BITUMEN	0.778282237
GREASES & LUBES	0.768364427
OTHERS	0.703142111
total petroleum	0.954018878
natural gas	0.87817744

**Table VI:** Descriptive Statistics of Demand and supply

	N	Minimum	Maximum	Mean	Std. Deviation
2012-13	2	152.94	221.59	1.8726E2	48.54359
2013-14	2	168.64	231.80	2.0022E2	44.66228
2014-15	2	160.44	229.92	1.9518E2	49.13473
2015-16	2	186.21	269.61	2.2791E2	58.97412
2016-17	2	176.97	246.78	2.1187E2	49.35888
TOTAL	2	845.19	1199.70	1.0224E3	250.67713

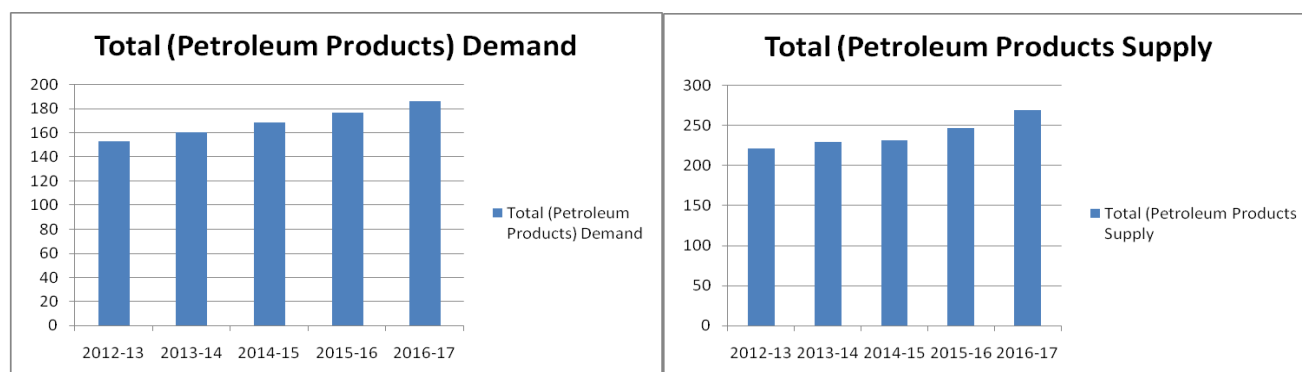


Table I is showing the Production of Petroleum Products from 2004-05 to 2011-12. Table 2 and table 3 show Estimated Demand and production for various Petroleum Products respectively. Table 4 is about estimated total demand and supply.

Table V is analytical table showing correlation between demand and supply of various petroleum products. It is found that coal is available very highly and positive correlation is found between demand and production forecasted of petroleum product and natural gas for 2012-13 to 2016-17 which is 0.954018878 and 0.87817744 respectively by 2016-17

Detail study and statistical survey of various petroleum products shows positive and negative correlation between demand and supply. Some of the petroleum product i.e. LPG, Naptha, MS, SKO are negatively correlated means production is less comparative to demand. Production is not sufficient in spite of heavy demand of these product by 2016-17. On the other hand some of the petroleum product i.e. HSD, ATF, LSFS/FO, BITUMIN, GREASE & LUBES and other product of petroleum are highly positive corrected. It shows supply will be available according to demand of various product by 2016-17. Production and demand of all the eleven sources are also increasing which seems a favorable signs for energy sector. Exploration of some of the petroleum product i.e. LPG, Naptha, MS, SKO should be increase as they are found less to demand.

Table VI is the description of demand of petroleum product. It shows that there is highest fluctuation is in the year 2015-16 and the least fluctuation in demand and supply.

## X. CONCLUSION

Requirement of new energy resources is an integral part of the development process. It is dominating as a major prerequisite in the present era where development is industry and technology based which is mainly energy dependent. The compulsion of global connectivity and exploring the space in view of shrinking earth resources further emphasize focus on new energy resources. The purpose of the paper was to find demand and supply forecasting up to 2016-17. It was found that it would be possible to improve the production level in comparison to demand of petroleum product and gas. Energy sector definitely will grow. Demand of the petrol and gas will increase if it would possible to meet with demand. It would have a positive impact on progress of energy sector in India.

The present paper well considers and analyses the trend in production of LPG, Naptha, MS, SKO, and HSD, ATF, LSFS/FO, BITUMIN, GREASE & LUBES and natural gas in India.

It is suggested to acquire and explore more area for which is available for exploration for oil and petrol. More research trend and activities should develop. Public private partnership concept should used to utilize more available natural resources, i.e. Cairn energy India Ltd. is discovering oil basin field form 2004 one after one Ravva in Andhra Pradesh, CB-OS/2 in Gujarat and Mangla, by Raageshwari, Bhagyam, Aishwariya, Kaameshwari and GR-F fields RJON-90/1 in Rajasthan. The company operates a producing oil field in the Indian private sector.

The study is presenting some factual inputs, which are useful in planning the related development process. The finding of energy resources will substantially add to self-reliance of the country in the energy sector.

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